REMARKS

Claims 1-20 and 26-36 stand allowed. Applicants herewith amend claim 21 to more clearly specify that which Applicants believe to be the invention. Basis for the amendments may be found in the original claims and throughout the specification (at page 7, for example). No new matter is added. Claims 1-36 remain in the application. Applicants respectfully request reexamination and reconsideration of claims 21-25 as amended.

In the Office Action mailed on February 08, 2005, Examiner rejects claims 21-25 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,959,750 issued to Eskildsen *et al.* (Eskildsen'750) in view of U.S. Patent No. 6,714,742 issued to Hayee *et al.* (Hayee'742). Applicants respectfully traverse these rejections for the following reasons.

Applicants respectfully assert that Examiner has not stated a proper *prima facie* case of obviousness in support of the rejections of claims 21-25, for the following reasons. Because a proper *prima facie* case for obviousness is absent, Applicants do not at this time offer rebuttal evidence of nonobviousness for rejected claims 21-25. . According to the Manual for Patent Examining Procedure (MPEP) §2142, a proper *prima facie* case of obviousness can be established only when all of three basic criteria ("prongs") are met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references when combined must teach or suggest all the claim limitations.

Regarding the first prong, the initial burden is on the Examiner to provide some **suggestion** of the desirability of doing what the inventor has done. The Examiner recites no evidence or suggestion for such combination from the prior art, despite the clearly-felt need for and the several motivating advantages of the combination discussed by Applicants in the present application. The teaching or **suggestion** to make the claimed combination **and** the reasonable expectation of success **must both be found in the prior art**, and not based on Applicants' disclosure [*In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)]. The level of skill in the art cannot be relied upon to provide the **suggestion** to combine references [*Al-Site Corp. v.*

VSI Int'l Inc., 174 F.3d 1308, 50 USPQ2d 1161 (Fed. Cir. 1999)]. Thus, Applicants respectfully assert that there is no suggestion for combining elements from (Eskildsen'750) and (Hayee'742), even in the present application. Accordingly, the present office action of February 08, 2005 does not support the first prong of a proper *prima facie* case of obviousness.

Regarding the second prong, Applicants can find no discussion of the likelihood of success (as found in the prior art) in the present office action of February 08, 2005 and therefore respectfully assert that the office action does not support the second prong of a proper *prima facie* case of obviousness.

Regarding the third prong, even when combined, Eskildsen'750 and Hayee'742 do not anticipate every element of Applicants' claimed invention. Eskildsen'750 discloses a method for upgrading optical fiber data capacity by adding Raman amplification to an existing transmission system that happens to use a Mach-Zehnder modulator for **intensity-modulation** of the optical signal, which is entirely unrelated to **polarization-modulation**. We know that this is **intensity** modulation because, in the well-known Mach-Zehnder modulator, an electrical modulation signal representing input data is applied to two electrodes on top of two optical (chromophoric) waveguides such that the electrical fields, encoded with data, changes the indexes of refraction by means of the electro-optic effect in the optical waveguides below. Because the chromophores in the two waveguides are arranged in opposite orientations during the fabrication process, their refractive indices are changed in opposite directions by the electrical fields. When a constant intensity laser beam is split into the two optical waveguides (whose refractive indices are modulated and different), the light speeds up in one waveguide while slowing down in the other. When these two light beams are recombined, they interfere with each other such that the combined intensity is modulated with the input data. Eskildsen'750 neither considers nor suggests using *a plurality (I) of electro-optical modulators each coupled to the PRBS generator and disposed for modulating the* ***polarization mode*** *of the i^{th} optical signal S_i according to the i^{th} pseudorandom bit sequence $PRBS_i$ to form a modulated optical signal MS_i, where $i = \{1, \ldots I\}$, thereby producing a plurality of* ***mutually-orthogonal polarization-mode modulated optical signals*** *$\{MS_i\}$* as claimed by Applicants in base claim 21. In fact, except in connection with the definition of the Raman efficiency coefficient (col. 5 at line 28), Eskildsen'750 never mentions optical polarization in any context whatsoever.

Hayee'742 discloses a simple polarization-division multiplexing (PDM) technique that avoids the well-known PDM difficulties by creating two polarization components distinguished by their different power levels to facilitate demultiplexing without the need for recovering signal polarizations. It is the effective recovery of these signal polarizations that is the well-known unsolved PDM problem that is solved for more than two components for the first time by Applicants' claimed invention. Hayee'742 neither considers nor suggests using *a plurality (I) of electro-optical modulators each coupled to the PRBS generator and disposed for modulating the* ***polarization mode*** *of the i^{th} optical signal S_i according to the i^{th} pseudorandom bit sequence $PRBS_i$ to form a modulated optical signal MS_i, where $i = \{1, \ldots I\}$, thereby producing a plurality of* ***mutually-orthogonal polarization-mode modulated optical signals*** *$\{MS_i\}$* as claimed by Applicants in base claim 21. Thus, alone or in combination, neither Eskildsen'750 nor Hayee'742 consider or suggest Applicants' solution to the well-known unsolved PDM problem as claimed in base claim 21. Accordingly, the cited combination of references is insufficient to meet the third prong of a proper *prima facie* case of obviousness.

For these reasons, Applicants' respectfully request reconsideration and withdrawal of the 35 U.S.C. §103(a) rejections of claims 21-25, as amended. Early allowance of claims 21-25 is respectfully solicited.

Respectfully submitted,

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